

REMARKS

Claims 1-15, 25 and 27 are currently pending. Claim 1 has been amended to reflect that the support structure is not tolerant of a reaction temperature of the catalyst, and non-elected claims 16-24 and 26 have been cancelled without prejudice or disclaimer.

Applicants note with appreciation that the rejection based on 35 U.S.C. §112, second paragraph, has been withdrawn.

The Office Action repeats the rejection of claims 1, 2, 5, 7-10, 25 and 27 under 35 U.S.C. §102(b) as allegedly being anticipated by the *Tennent et al.* (U.S. Patent No. 5,165,909). This rejection is respectfully traversed.

In reviewing the most recent Office Action, it is not clear to the undersigned where the Examiner might have addressed the arguments presented at page 9 of the Amendment filed February 20, 2003, regarding claim 1. Rather than ask the Examiner to reissue the Office Action with comments, applicants remarks are represented in somewhat different form and emphasis.

The Tennant et al. Patent

The *Tennent et al.* patent is directed to a method of producing carbon fibrils. As, illustrated in Figure 6, it includes a tower reactor which has strip heaters for heating the inside of the furnace to a requisite degree of 1100°C at one end. With reference to the various examples beginning at column 11, line 26, the various fibril synthesis runs are conducted in a furnace in which all the materials in the furnace are heated to a reaction temperature. At column 8, beginning at line 59, it is disclosed in the Tennent et al. patent that the reaction temperature "must be high enough to cause the catalyst particles to be

active for fibril formation, yet low enough to avoid significant thermal decomposition of the gaseous carbon-containing compound with formulation of pyrolytic carbon". It then goes on to state that "[i]n cases where thermal decomposition of the gaseous carbon-containing compound occurs at a temperature near or below that required for an active fibril-producing catalyst, the catalyst particle may be heated selectively to a temperature greater than that of the gaseous carbon-containing compound[.] Such selective heating may be achieved, for example, by electromagnetic radiation." The only other mention of electromagnetic radiation heating of the catalyst is found in column 4, lines 45-50 where it is disclosed that "the surface of the metal-containing particle is independently heated, e.g., by electromagnetic radiation, to a temperature between about 850°C and about 1800°C, the temperature of the particle being higher than the temperature of the gaseous, carbon-containing compound."

It is reiterated that the substantive examples of heating in the *Tennent et al.* patent are described only as "heating" by an electric furnace or tower reactor type furnace. Radiation generated by an electric heater is properly described as "electromagnetic radiation" in the form of infrared radiation. Hence, it appears that infrared radiation is what is meant when the *Tennent et al.* patent speaks of "electromagnetic radiation" in selectively heating the catalyst particles.

As can be seen, the *Tennent et al.* patent does not teach or suggest the various features of the present invention which include that the support structure does not have to be formed of a heat resistant material that can tolerate high reaction temperatures. Instead, the present inventors have discovered that by selectively and locally heating the catalyst,

selection of the support structure is not restricted to materials that are tolerant of high amounts of heat.

Hence, with respect to claim 1, it is noted that the *Tennent et al.* patent, in its description of only ceramic substrates, does not teach or suggest a reactor for receiving a catalyst on a **support structure that is not tolerant of a reaction temperature of the catalyst**. This aspect of the present invention is counterintuitive it provides great advantage insofar as broader range of support structures can be used.

Hence, it is respectfully submitted that the claims 1, 2, 5, 7-10 and 27 are not anticipated by the *Tennent et al.* patent. Further, it is clear the *Tennent et al.* patent would not suggest using a support structure that is not tolerant of the reaction temperature of the catalyst. With respect to independent claim 25, it is noted that the invention is recited as including selectively and locally heating the catalyst and the reactor wherein the heating is restricted to the catalyst. In the *Tennent et al.* patent, it is apparent that the inductive electromagnetic radiation heating as it is described in the *Tennent et al.* patent apparently heats up the gaseous carbon-containing compound and would heat up other structures, just not as much as the active fibril producing catalyst. See column 8, line 59 *et seq.*

The Office Action also includes a rejection of claims 3 and 4 under 35 U.S.C. §103 as allegedly being unpatentable over the *Tennent et al.* patent as applied to claim 1 and in further view of the *Mandeville et al* patent (U.S. Patent No. 6,423,288); and a rejection of claims 6 and 11 under 35 U.S.C. §103 as allegedly being unpatentable over the *Tennent et al.* patent in view of the *Kambe et al.* patent (U.S. Patent No. 6,045,769). These rejections are respectfully traversed as well.

The *Mandeville et al* patent is merely applied for teaching various methods of loading a catalyst and the *Kambe et al.* patent is applied for merely disclosing a reactant stream can include other reactants such as hydrogen gas or hydrogen sulfide. As such, these patents, even assuming arguendo that they fully support the proposition for which they are offered, would not cure the deficiencies of the rejections as articulated above with respect to the *Tennent et al.* patent. Accordingly, Applicants respectfully request reconsideration and withdrawal of these rejections.

The Office Action further includes a rejection of claims 12-15 under 35 U.S.C. §103 as allegedly being unpatentable over the *Tennent et al.* patent either alone or in combination with the *Margrave et al.* patent (PGPub. U.S. 2002/0004028).

As an initial matter, it is noted that the *Margrave et al.* patent publication is not prior art. The *Margrave et al.* patent as an effective U.S. filing date of March 16, 2001 whereas Applicants have an effective filing date of September 22, 2000 based on a claim of priority to Korean Patent Application No. 00-55829. To perfect Applicants' claim for priority, a certified translation of this priority application is attached hereto. Upon review by the Examiner, it is believed that the Examiner will agree that the *Margrave et al.* patent does not constitute prior art in the instant application.

Hence, the only remaining rejection is the Examiner's taking of official notice that the *Tennent et al.* patents identification of electromagnetic radiation necessarily suggests microwave heating, electromagnetic induction heating, laser heating or RF heating. While the broad generic term of electromagnetic radiation can encompass any of these type of heating, it must be noted that the terms of a patent must be read in context. The *Tennent et*

al. patent, it is reiterated, identifies only an electric furnace or a tower reactor type furnace. Hence, it is believed that it is the identifying electromagnetic radiation in the form of infrared radiation. This is particularly true insofar as it infers that the gaseous carbon containing compound is also heated and the specific examples rely on ceramic substrates, suggesting that they need to be heat tolerant.

Also, it is noted that some specific forms of heating would seem counterintuitive to the overall disclosure of the *Tennent et al.* patent such as dielectric heating by microwaves and simply light absorption such as light from a light source.

It is respectfully submitted that when reading the passage at column 8, beginning at line 59, one skilled in the art not think of microwave heating insofar as it is generally assumed that placing metals into a microwave oven during operation causes sparks but little heating due to a shorting effect. This is not the case in the context of the present invention insofar as the catalysts are not shorted together. It is respectfully submitted that mention of "electromagnetic radiation" as heating the surface of metals would not suggest to one of ordinary skill in the art the use of microwaves, at least in the context of the *Tennent et al.* patent. Hence, with respect to microwaves, Applicants respectfully submit that claim 12, as placed in independent form, is patentably distinct.

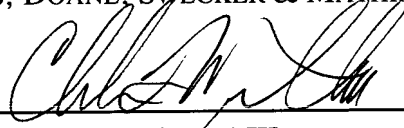
Similarly, one would not anticipate the use of laser light such as recited in claim 14 insofar as such mechanism is complicated by the idea of shining laser beams on individual catalyst particles. If such a disclosure were intended or suggested by the *Tennent et al.* patent, surely more details would have been offered.

In light of the foregoing, Applicants respectfully request reconsideration and allowance of the above-captioned application. Should any residual issues exist, the Examiner is invited to contact the undersigned at the number listed below.

Respectfully submitted,

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